Agenda

Turtle Bay Meeting Room, Caneel Bay

Tuesday, July 11

I. Introductions and workshop purpose

0900-0915 Workshop goals, desired outcomes & products (**Davis**)

0915-1000 Participant self-introductions

1000-1030 Workshop format and process, discussion of agenda (**Davis**)

1030-1130 Keynote *Passionate Stewardship*—legal mandates, expectations, and goals for National Park System marine reserves—**Joel Tutein**, Buck Island Reef National Monument

1130-1300 LUNCH

II. Expectations and Goals of Marine Reserves

1300-1400 Panel on marine reserve goals & expectations (**Bohnsack, Friedlander, Boulon, Wulf**)

1400-1530 Breakout Groups (discussion leaders: fish-**Keller**, benthic-**Hernandez**, social-**Valdez-Pizzini** and management- **Moss)**

1530-1600 BREAK

1600-1700 Report back in plenary

Wednesday, July 12

III. Connectivity—Ecological, Social, and Management Systems

0830-0930 Panel on Connectivity (**Cowen, Birkeland, Valdez-Pizzini, Reveles)**

0930-1045 Breakout Groups (discussion leaders for fish-**Tobias**, benthic-**Beets**, social-**Suman**, and management-**Prada**)

1045-1115 BREAK

1115-1200 Report back in plenary

1200-1330 LUNCH

IV. Marine Reserve Research and Monitoring

1330-1430 Panel on Research & Monitoring (**Monaco, Miller, Bonn, Oxenford**)

1430-1600 Breakout Groups (discussion leaders for fish-**Friedlander,** benthic-**Smith**, social-**Woodfield,** and management-**McCreedy**

1600-1615 BREAK

1615-1700 Report back in plenary

Thursday, July 13

V. Next Steps—How to Advance Research & Monitoring of Marine Reserves

0830-0930 Case Studies—(**Hernandez, Moss, Prada, Woodfield**)

0930-1030 Review workshop findings, redefine products and outcomes (**Davis, Brewer, Keller, Sobel**)

1030-1100 BREAK

1100-1200 Panel on research and monitoring plans (**Patterson, DeMeyer, Majil, Halley)**

1200-1330 LUNCH

1330-1500 Breakout Groups (discussion leaders for fish-**Jeffrey** benthic-**Rogers**, social-**Suman**, and management-**Hillis-Starr**)

1500-1530 BREAK
1530-1630 Report back in plenary
1630-1700 Closing remarks (**Davis, et al**.)

Examples of specific questions to be addressed by panel speakers for each topic include, but are not limited to the following:

II. Expectations and Goals of Marine Reserves

- Given the current degradation of many coral reefs in the Caribbean from overfishing, disease, and bleaching, how does reserve level protection affect recovery of fish assemblages; other exploited and ecologically significant organisms such as the sea urchin *Diadema antillarum*, conchs, and lobsters; and benthic habitats (including coral reefs, sea grass beds, mangroves)?
- The 2005 bleaching episode and subsequent increase in severity of coral diseases have caused extensive coral mortality. Will these stressors undermine or negate any benefits of reserve level protection?
- What effects will increased sea water temperatures have on calcification (reef structure)? If marine reserves are successful in restoring ecological balance, how will calcification rates be affected?
- What role can marine reserves play in protecting reef ecosystems in the face of global change and severe outbreaks of disease?
- How can we measure effectiveness of marine reserves in maintaining or "restoring" ecological structure and function?
- Reduced algal cover apparent inside reserves? Increased recruitment of corals and fish?
- What are the social and ecological goals of the VI marine reserves, not only the goals that have been explicitly stated in writing but goals that park superintendents and resource managers have?
- With VI marine reserves, what can we (managers and others) realistically expect the effects of reserve designation will be with respect to the fish assemblages, the fisheries, and the benthic habitats? What changes in fish assemblages and in benthic community structure could occur (increase in groupers, reduced or increased algal cover)?

III. Connectivity—ecological, social, and management

- Can the recent losses of coral cover associated with bleaching/disease be correlated with changes in associated fish assemblages now or in the future?
- What are the benefits of including upland (terrestrial) areas adjacent to marine areas when marine reserves are being designed?
- What evidence is there for connectivity among different marine reserves within the Caribbean? What innovative approaches can be used to show such connectivity (e.g., degree of relatedness among populations of elkhorn coral based on genotypic diversity of elkhorn coral)
- What evidence is there that herbivorous fishes increase within reserves? Marine reserves consistently lead to greater density and average size of predators but effects on prey species are more variable. (For example, a recent study showed an increase in predatory fishes within reserves led to greater density of parrotfishes

of species that reach larger sizes inside reserves than outside but not a similar pattern for those of species that reach smaller size.)

- How are inshore areas within Virgin Islands National Park linked to offshore areas within Virgin Islands Coral Reef National Monument, i.e., what is the connectivity between these areas?
- How are the reserves (and the national park) in the USVI linked to each other and to upstream and downstream sites?
- Seagrass beds appear to be improving following installation of mooring buoys within VINP–how might these changes affect fish and other organisms?

IV. Research and Monitoring

- What additional monitoring programs (or sites) are required to document changes in benthic habitats that can be attributed to (correlated with) the elimination of fishing (i.e., reserve designation)? [Changes in benthic habitats resulting from the creation of a marine reserve are harder to demonstrate than changes in abundance and size of fishes.]
- What additional monitoring programs (or sites) are required to document changes in fish assemblages that can be attributed to (correlated with) the elimination of fishing (i.e., reserve designation)?
- Reduced algal cover apparent inside reserves? Increased recruitment of corals and fish?
- Can we rigorously demonstrate that these effects have occurred given that there are limits to what we can prove and inevitable sampling constraints?
- Quality, quantity and distribution of habitats are all important factors. Do the VI marine reserves encompass all of these attributes?
- The 2005 bleaching event was particularly severe in the USVI and Puerto Rico. What additional monitoring and experimental research should be done to demonstrate effects of coral mortality on fishes and other reef organisms?
- What is the pattern of dispersal of fish and corals? What are the current patterns in the marine reserves and what degree of local larval retention results?
- Seagrass beds appear to be improving following installation of mooring buoys within VINP–how might these changes affect fish and other organisms?
- What monitoring and experimental research is going on in the VI or planned in the near future?
- What other monitoring and research should be taking place (if funds and people were available)? (e.g., mangrove nursery areas, fish larvae; process-oriented research on calcification, herbivory, productivity, recruitment, role of solar radiation in bleaching; relationship of currents to bleaching and disease).